CAMPUS TECHNOLOGY

Online Course Development: What Does It Cost?

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Does it cost less to design and develop online teaching and learning today than it did a few years ago? Are the categories of cost different today from the past and from what the costs might be in the future? The costs of developing online programs are significant, yet there are few resources to help planners. Here, Judith Boettcher proposes a few guidelines for predicting the costs involved in the design and development of online instruction.

Five or more years ago, projects for the design and development of online instruction included costs for basics such as faculty hardware and software, instructional programmers, and other campus infrastructure and applications that are now, hopefully, in place. In the early years, the environment and applications for an online course often had to be designed and built from scratch, line of programming code by line of programming code. In addition to these costs, there were the familiar costs of faculty professional development time and many expenses associated with content research, selection, capture, analysis, and digitization.

Much of our current infrastructure now includes learning management systems, faculty and student support personnel, and content licensing. That means the instructional costs for teaching and learning online are distributed more broadly across the campus community. This leads us to Rule of Thumb #1.

Rule of Thumb #1: A Learning Management System Reduces Costs for Design, Development, and Delivery—Use an LMS

The campus digital plant—the online system analogous to our campus physical plant—is here. With an LMS, faculty have an entire online teaching and learning classroom, campus resource, and conference center suite at their disposal. A campus infrastructure that provides a learning management system (LMS) for their faculty and students provides not only the four virtual walls of a classroom—the course Web site—but also places for gathering, discussing, and thinking that students can use for forums, student discussion areas of all types, faculty office meeting spaces, project working space, presentations, and virtually infinite databases and libraries of content. The LMS systems available today offer flexible environments that readily and easily support the three dialogues for effective teaching and learning: faculty-to-student dialogue, peer dialogue, and student-to-resources dialogue.

It bears repeating—the first rule of thumb is to use an LMS. Whether it is a commercial, home-grown, or open source system is not as important as whether it meets most of the collective needs, philosophy, and wants of the faculty delivering degree programs. Deciding which LMS to use is usually a campus-wide decision process, as it is akin to architecting and designing a classroom building system to serve all campus and online courses for a minimum of three to five years. For a quick look at the number and size of LMSes that are available, go to www.edutools.info where more than 100 LMSes are described according to over 40 different features and functions. The recently announced open source Collaboration and Learning Environment (CLE) software being developed by the Sakai Project (http://www.sakaiproject.org/) will very likely be an additional key resource in the future.

In addition to the community-wide campus infrastructure, faculty and students now have their own personal knowledge infrastructure. This personal infrastructure consists of laptops, basic and advanced productivity software, communication (often wireless) access, and all-digital textbooks, if desired. A prime example of the personal knowledge infrastructure is the laptop university model. With the advent of wireless access, more and more campuses are looking like laptop universities. What a difference just a few years can make!

Rule of Thumb #2: The More Hours of Instruction to be Designed and Developed, the Higher the Cost of Design and Development

Rule of Thumb #2 may seem obvious, but determining the number of hours of instruction to be designed for in a given program is not always obvious. For example, how many hours of online learning make a three-credit course? Here is a formula, based on the traditional model of a campus course: Using a formula of two hours of study outside class for every hour in class means that the usual three-credit campus course is 135 hours (45 hours of class time and 90 hours of directed study outside the class time). This formula means faculty transitioning a campus course to an online format only have to design and develop the 45 hours traditionally spent in the classroom. However, once this transition is done, many of the additional 90 hours of directed study are also redesigned over time. By the way, the number of hours—135—can be increased or decreased, based on the design of a particular program as well as the expectations of a campus culture.

1994 - 2000 **Phase 1: Launching of Online learning**	**2001 - 2005** **Phase 2: Infrastructure and Course Model Development**	**2006 - 2010** **Phase 3: Institutionalizing and Refining of Online Learning**
• Hardware and software • Support and training • Infrastructure development • Networking and access to network	• Infrastructure development • Learning management systems and support • Networking and wireless access • Faculty and student	• Infrastructure, including networking and support, is assumed and part of campus environment • Wireless

	personal knowledge tools	communications access everywhere
• Design/development of early course and tool templates	• Instructional tool design and development • Development of online and distance course models	• Licensing of courses, including instructional team and support • Collaborative development across institutions
• Programmers	• Design/development of application-specific tools and resources • Instructional Developers	• Licensing and purchase of higher-level tools and development "engines," and middleware developed by programmers
• Content digitization projects	• Design of repositories and databases of content • Development of animations, simulations • Development of learning objects	• Development of complex, authentic learning objects • Search for and licensing of learning objects • Subscriptions to content repositories and news feeds.

The cost literature provides estimates for the number of hours of faculty effort required to design/develop an hour of instruction in media such as a lecture, a videotaped lecture, a book, or online material. A good planning number for a new faculty developing online instruction five years ago was 18 hours per hour of instruction, or 810 hours for a fully online course. Given the current campus infrastructure, personal knowledge tools, and the availability of digital content such as course cartridges, online cyber problems, and test banks, a recommended planning number today for experienced faculty is 10 hours per hour of instruction.

This is faculty time, and does not include the time for other support personnel, such as project managers, instructional designers, or other support. However, as faculty develop expertise, as the tools get better, designing and developing online instruction becomes closer to the time required for developing face-to-face instruction. It is the transformational design and the building of technology habits that takes time now.

Rule of Thumb #2: Corollaries

- The first online course designed/developed by a faculty member takes longer than the second course.
- Adopting a textbook for a course that has extensive online content for faculty and students saves design and development time.
- Developing simulations, animations, and sophisticated learning objects are not included in the time estimates above.

It's good news that the time required to build an online course has decreased over time, but the decrease may not be as much as one hopes. The work from the Washington State University case study in the TCM/Bridge Project report (Jewett, 2002, p. 32) estimated a "learning curve" effect of only 10 percent for a second course. This means that the formula for a second course conversion would be 90 percent of the effort for a first course.

Institutions provide design and development, including learning time, for faculty in a number of ways. For an online Master's of Engineering in Professional Practice (MEPP) at the University of Wisconsin (Pferdehirt, 2004), faculty have 1.2 months to prepare an online course, followed by another 1.8 months to pilot the course with a small group of students. Another professional program in information studies (Estabrook, 1999) provides summer money or release time to develop an online course. When first-time faculty deliver an online course, it is the only course they teach that semester.

In the future, the faculty work in design and development may shift to more of an emphasis on being able to quickly identify and integrate more sophisticated and hopefully, advanced and effective learning materials. In related developments, gaming vendors are searching for efficiencies in developing games for "hours of play" by licensing sophisticated graphic engines. As noted in a recent article, "A typical game these days costs millions of dollars to produce, much of it going to huge teams of programmers" (Gomes, 2004). Once evolved by the gaming vendors, we may see these middleware engines available for our instructional content materials.

Rule of Thumb #2: Irony

I would be remiss not to note the irony that can result from using the metric of the hour of instruction for costing instruction. Well-structured materials, including simulations, animations, and micro-worlds, that might assist students in learning core concepts and in developing authentic skills can require hundreds of hours of design and development time. On the plus side, student time in learning decreases, and this is particularly useful for highly paid professional lifelong learners.

Rule of Thumb #3: Design and Development of Online Degree Programs Can Cost Up to $25,000 Per Credit Hour

If program planners use a working estimate of $10,000 per credit hour for a master's degree program, then a 30-credit master's degree program can require an investment of $300,000. The available examples in the literature often provide examples of investments ranging higher, in the neighborhood of $15,000 to $20,000 per credit hour. Institutions have been very creative in finding ways to reduce these up-front investment costs. Some strategies that appear to be successful are collaborating with other institutions and finding corporate sponsors for whom programs are specifically designed and delivered.

Rule of Thumb #4: Instructional Costs Shift with Technology Developments and Models of Instruction

Table 1 attempts to capture some of the shifts in primary cost categories over time. The most useful part of the chart may be in anticipating the next shift in cost categories. Where are the new costs likely to be? In particular, we ought to tentatively plan for increased costs in the area of licensing sophisticated and timely content resources. Also, the work of the faculty is becoming even more unbundled, so that an instructional team will need to be recruited, trained, and managed.

1994 - 2000 **Phase 1: Launching of Online learning**	**2001 – 2005** **Phase 2: Infrastructure and Course Model Development**	**2006 – 2010** **Phase 3: Institutionalizing and Refining of Online Learning**
• Securing sponsorship and investment funds		• Securing sponsorship and investment funds • Traditional planning and budgeting within college and organizations
• Piloting and experimentation	• Piloting and experimentation • Online learning as cost center primarily	• Program analysis and market research • Online learning as cost center and also fully integrated; • Online learning as a schedule option
• Project management and administration • Instructional Design		
• Faculty development, time and expertise	• Faculty development, time and expertise • Gradual expansion of instructional team	• Faculty development, time and expertise • Recruiting, training and managing of instructional team

Table 2 shows some of the cost categories for the design and development of online learning that have remained more constant over these transitional times. Many of these categories are costs associated with managing change across many segments of the campus faculty and staff. Another primary area of relative constancy is that of content. The development of content is expensive and will continue to be so in the future, even as we develop and have more access to sophisticated, authentic, complex instructional objects and as access to current news and well-structured databases increases in importance to instruction.

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A Challenge to Study Costs

While it is still difficult to identify accessible literature on the costing of instruction, resources to assist in the costing and budgeting of instruction, whether on campus or online, are beginning to increase. The most comprehensive resource at this time that is freely available is the Technology Costing Methodology Handbook (Jones, 2001). We have many challenges going forward in this area as the standards and metrics for costing instruction remain in flux and difficult to define—probably because the instructional mission is so integrated with an institution’s multiple missions. However, it is a challenge worth taking on, and I encourage you to contribute to these efforts.